

**Science A**

General Certificate of Secondary Education

Unit **A212/02**: Modules B2, C2, P2 (Higher Tier)

**Mark Scheme for June 2011**

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All Examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes should be read in conjunction with the published question papers and the Report on the Examination.

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Question		Answer	Mark	Guidance															
1	a	<table border="1"> <thead> <tr> <th>paper</th> <th>poly(ethene)</th> <th>cannot tell</th> </tr> </thead> <tbody> <tr> <td></td> <td>✓</td> <td></td> </tr> <tr> <td></td> <td>✓</td> <td></td> </tr> <tr> <td></td> <td>✓</td> <td></td> </tr> <tr> <td></td> <td></td> <td>✓</td> </tr> </tbody> </table>	paper	poly(ethene)	cannot tell		✓			✓			✓				✓	3	all 4 lines correct = 3 marks 3 lines correct = 2 marks 2 lines correct = 1 mark 1 line correct = 0 marks
paper	poly(ethene)	cannot tell																	
	✓																		
	✓																		
	✓																		
		✓																	
	b	candidate is aware that there are fewer journeys (with polythene bags than paper bags) (1) candidate is aware that there is less pollution (1)	2	<b>allow</b> implication that less fuel/energy used in transportation <b>ignore</b> answers relating to sustainability of fuel															
<b>Total</b>			<b>5</b>																

2	a	i	50 (1)	1	<b>accept</b> 49 as this is the median value
		ii	<b>any two from:</b> outlier / anomaly / 34 far outside other values / 34 is an outlier; outlier discarded; lowest and highest of other values;	2	answer such as 'ignore/discard 34' get 2 marks  <b>allow</b> 'most of the values are in this range' for 3 <sup>rd</sup> marking point
	b		molecules; sliding (past each other); flexible;	1	words in correct order all 3 correct = 1 mark <b>accept</b> any clear indication
<b>Total</b>				<b>4</b>	

Question			Answer	Mark	Guidance											
3	a	i	carbon and hydrogen (1)	1	both answers in either order = 1 mark <b>ignore</b> 'C' or 'H'											
		ii	A and D (1)	1	both answers in either order = 1 mark											
	b	i	polymerisation (1)	1	<b>accept</b> polymerising but <b>not</b> polymers											
		ii	<table border="1"> <thead> <tr> <th>decreases melting point</th> <th>increases melting point</th> <th>melting point stays the same</th> </tr> </thead> <tbody> <tr> <td>✓</td> <td></td> <td></td> </tr> <tr> <td></td> <td>✓</td> <td></td> </tr> <tr> <td>✓</td> <td></td> <td></td> </tr> </tbody> </table>	decreases melting point	increases melting point	melting point stays the same	✓				✓		✓			2
decreases melting point	increases melting point	melting point stays the same														
✓																
	✓															
✓																
			<b>Total</b>	<b>5</b>												

Question		Answer	Mark	Guidance
4	a	microwaves = <b>B</b> , radio = <b>A</b>	1	both needed
	b	any plausible example of INFORMATION TRANSMISSION by: use <u>and</u> information sent by infrared (1); use <u>and</u> information sent by microwaves (1); use <u>and</u> information sent by radio waves (1);	3	<b>examples INCLUDE</b> infrared: <u>use</u> cable TV, <u>information</u> programme <u>use</u> remote control, <u>information</u> channel/volume <u>use</u> mobile phone (to laptop), <u>information</u> picture transmitted <u>use</u> night vision goggles, <u>information</u> location of person <u>use</u> burglar alarm, <u>information</u> presence of person  microwaves: <u>use</u> mobile phone, <u>information</u> picture/(encoded) speech/text <u>use</u> satellite TV, <u>information</u> programme ignore heating food, sound unqualified  radio waves: <u>use</u> radio, <u>information</u> music <u>use</u> radar, <u>information</u> location of aeroplane  'signal' alone is not enough for the information idea an annotated diagram can be accepted
	c	<div style="text-align: right;"> <input type="checkbox"/>  <input type="checkbox"/>  <input type="checkbox"/>  <input checked="" type="checkbox"/> </div> Microwaves can make particles ... <input checked="" type="checkbox"/> (1)	1	
<b>Total</b>			<b>5</b>	

Question			Answer	Mark	Guidance																		
5	a	i	<p style="text-align: center;"> <input type="checkbox"/>  <input type="checkbox"/>                      both Dean and Kate <input checked="" type="checkbox"/> (1)  <input type="checkbox"/> </p>	1																			
		ii	<p style="text-align: center;"> <input type="checkbox"/>  <input type="checkbox"/>  <input type="checkbox"/>                      neither of them <input checked="" type="checkbox"/> (1)                 </p>	1																			
	b		<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 70%;"></th> <th style="width: 15%; text-align: center;">true</th> <th style="width: 15%; text-align: center;">false</th> </tr> </thead> <tbody> <tr> <td>UV can be good for you.</td> <td style="text-align: center;"><input checked="" type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td>UV can damage living cells.</td> <td style="text-align: center;"><input checked="" type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td>UV is a non-ionising radiation.</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input checked="" type="checkbox"/></td> </tr> <tr> <td>UV is part of the EM spectrum.</td> <td style="text-align: center;"><input checked="" type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td>UV ... more energetic ... than X-rays.</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input checked="" type="checkbox"/></td> </tr> </tbody> </table>		true	false	UV can be good for you.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	UV can damage living cells.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	UV is a non-ionising radiation.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	UV is part of the EM spectrum.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	UV ... more energetic ... than X-rays.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	2	all correct = 2 marks 4 correct = 1 mark
	true	false																					
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<b>Total</b>				<b>[4]</b>																			

Question			Answer	Mark	Guidance
6	a	i	<div style="text-align: right;"> <input type="checkbox"/>  <input type="checkbox"/>  <input type="checkbox"/>  ... those which contain more than two atoms <input checked="" type="checkbox"/> (1) </div>	1	
		ii	<div style="text-align: right;"> <input type="checkbox"/>  carbon dioxide <input checked="" type="checkbox"/>  <input type="checkbox"/>  <input type="checkbox"/>  oxygen <input checked="" type="checkbox"/> </div>	1	both required for 1 mark
	<b>b</b>	<b>i</b>	4 / fertiliser (1)	1	
		<b>ii</b>	4 / fertiliser (1)	1	
		<b>iii</b>	1 / space mirrors, 2 / sulfur clouds, 3 / seawater clouds, and 5 / shiny roofs (1)	1	all 4 needed <b>accept</b> 'all but 4' owtte
			<b>Total</b>	<b>[5]</b>	

Question			Answer	Mark	Guidance																				
7	a	i	taken over / damaged / killed / destroyed <u>and</u> new viruses / poisons / toxins (1)	1	both ideas needed to award the mark																				
		ii	fungi/fungus <u>and</u> bacteria/bacterium (1)	1	answers can be in any order																				
	b	i	<p><b>any three from:</b>                      effect of vaccine on your child, talks about 'the child' getting the disease;                      effect on other children / disease spreads (to other non-vaccinated individuals) / epidemic;                      (costs society money because) more working days lost;                      and cost of treating ill people;</p>	3	<b>accept</b> 'non vaccinated individuals catch the disease' for this point																				
		ii	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%; text-align: center;">description</th> <th style="width: 50%; text-align: center;">conclusion</th> </tr> </thead> <tbody> <tr> <td style="height: 40px;"></td> <td style="height: 40px;"></td> </tr> <tr> <td style="height: 40px;">MMR vaccination did not change ...</td> <td style="height: 40px;"></td> </tr> <tr> <td style="height: 40px;"></td> <td style="height: 40px;"></td> </tr> <tr> <td style="height: 40px;"></td> <td style="height: 40px;"></td> </tr> <tr> <td style="height: 40px;"></td> <td style="height: 40px;"></td> </tr> <tr> <td style="height: 40px;"></td> <td style="height: 40px;"></td> </tr> <tr> <td style="height: 40px;"></td> <td style="height: 40px;"></td> </tr> <tr> <td style="height: 40px;"></td> <td style="height: 40px;"></td> </tr> <tr> <td style="height: 40px;"></td> <td style="height: 40px;"></td> </tr> </tbody> </table> <p style="text-align: center;">MMR is not linked to autism.</p>	description	conclusion			MMR vaccination did not change ...																2	first (description) mark for any CLEAR selection of <b>ONLY</b> top left box  second (conclusion) mark can <b>ONLY</b> be scored for CLEAR selection of <b>ONLY</b> top left and <b>ONLY</b> bottom right boxes  <i>conclusion is a consequential mark from correct description, and is not available from incorrect description</i>
description	conclusion																								
MMR vaccination did not change ...																									
<b>Total</b>				<b>[7]</b>																					



Question		Answer	Mark	Guidance
8	a	thicker, more muscular walls (1) to withstand high blood pressure (1)	2	<b>ignore</b> references to lumen
	b	oxygen / O <sub>2</sub>  carbon dioxide / CO <sub>2</sub> / waste / toxins  fat / clot / plaque / cholesterol / lipids / fatty deposits	2	answer must be in the correct order  all 3 correct = 2 marks 1 or 2 correct = 1 mark  the 2 on O <sub>2</sub> can be written as eg O <sub>2</sub> , O <sup>2</sup> or O2 <b>allow</b> O for oxygen in the first space  the 2 on CO <sub>2</sub> can be written as eg CO <sub>2</sub> , CO <sup>2</sup> or CO2 <b>allow</b> toxin in second answer space  <b>allow</b> HDL or LDL to mean cholesterol <b>allow</b> references to types of fat in third answer space
	c	i	1	both answers needed for one mark
		<p style="text-align: right;"><input type="checkbox"/></p> <p>Drinking alcohol can lead to other ... <input checked="" type="checkbox"/></p> <p style="text-align: right;"><input type="checkbox"/></p> <p>There is evidence from other research <input checked="" type="checkbox"/></p>		
		ii	1	both answers needed for one mark
		<p>Different scientists in another study ... <input checked="" type="checkbox"/></p> <p style="text-align: right;"><input type="checkbox"/></p> <p style="text-align: right;"><input type="checkbox"/></p> <p>Alcohol was shown to affect levels of HDL <input checked="" type="checkbox"/></p>		

Question			Answer	Mark	Guidance
8	c	iii	<div style="display: flex; align-items: center; justify-content: center;"> <div style="margin-right: 10px;">Specialist scientists evaluate the ...</div> <div style="display: flex; flex-direction: column; gap: 5px;"> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> (1)                 </div> </div>	1	
<b>Total</b>				[7]	

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